

REMARKS

The only independent claims remaining in the application are Claims 1, 2 and 3, each of which has been amended, and each of which is believed to be patentably distinct over the cited prior art. Dependent claims 9-15 are also pending.

Referring first to amended Claim 1, that claim relates to reading out a noise signal from a unit cell after resetting an input of an amplifier portion, and then reading out an optical signal, which includes the noise signal, so that the difference between the two signals can be determined. By these means, heat noise generated at the time of the resetting step can be removed from the optical signal, and this result can be obtained by virtue of the claimed transfer means between the photoelectric conversion portion of the amplifier portion.

Claim 1 was rejected in view of the disclosures of the cited Kochi and Goto references. Applicant respectfully submits, however, that those references, even if combined, do not disclose the invention of amended Claim 1. Specifically, a combination of those two references would not suggest in any way the solution to the noise problem which is set forth in amended Claim 1. First, Goto is relied upon for disclosing a common line which performs between two unit cells operating in time series fashion on a common power line which is acknowledged in paragraph 1 of the Office Action as not disclosed in Kochi. However, as understood, a transfer means and a reset means constitute the same switch in Goto, and no noise signal is read out. Also, Goto requires a line for controlling the transfer means, thereby increasing the aperture ratio of a unit cell and requiring the

prevention of crosstalk between control line signals due to a reduced distance between control lines.

For these reasons it is believed that amended Claim 1 is patentable over the cited references.

Amended Claim 2 is also believed to be patentable over the cited references. Particularly, Claim 2 requires a common line serving as the signal output line and as one of the three control lines. As understood, neither Kochi nor Goto contemplate a common line used for the signal output and one of the control lines. For these reasons, Claim 2 is believed to be allowable.

Finally, amended independent Claim 3, requires that each “unit cell comprises a plurality of photoelectric conversion portions connected to a common amplifying transistor” (see, eg., Figs. 21 and 23-25). Applicant stresses that this structure permits a reduction in the number of reset and selecting means, and that when this is coupled with the corresponding reduction in control lines, miniaturization and production yield improvements can be obtained. Applicant submits that such structure is not suggested in the cited references, so that amended Claim 3 is also allowable, together with dependent Claims 9-15, each of which takes its allowability from one of the above-mentioned Claims 1, 2 and 3, while including additional patentable distinctions.

Accordingly, for all of these various reasons, it is believed that the pending claims are allowable, and a formal Notice of Allowance is solicited.

Applicant's undersigned attorney may be reached in our New York office by telephone at (212) 218-2100. All correspondence should continue to be directed to our below listed address.

Respectfully submitted,



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VERSION OF CLAIMS MARKED TO SHOW CHANGES MADE THERETO

1. (Twice Amended) A solid-state image pickup device comprising [at least one] a plurality of unit cells arranged in a two dimensional matrix and each having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein one common line performs at least two different functions of a selection control line for controlling the selecting means, a transfer control line for controlling the transfer means, a reset control line for controlling the reset means, and a signal output line in a said unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells, and

wherein during operation of said selecting means, a noise signal and an optical signal including the noise signal are read out, in that order, from said signal output line, and the difference between said read out signals is determined.

2. (Twice Amended) A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion

portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein [one common line performs the different functions of a reset control line for controlling the reset means and a] the signal output line [in a unit cell, or between two unit cells operating in time series fashion,] and a line having at least one function of the three functions of a selection control line for controlling the selecting means, a transfer control line for controlling the transfer means, and a reset control line for controlling the reset means, comprise a single common line in a single unit cell or between two adjoining unit cells.

3. (Twice Amended) A solid-state image pickup device comprising at least one unit cell having a photoelectric conversion portion which generates a signal, an amplifying means for amplifying the signal generated in the photoelectric conversion portion, a transfer means for transferring the signal to the amplifying means, a reset means for resetting an input terminal of the amplifying means, and a selecting means for selecting the amplifying means and outputting an amplified signal to a signal output line,

wherein one common line performs [the] at least two different functions of a transfer control line for controlling the transfer means, a selection control line for controlling the selecting means, and reset control line for controlling the reset

means, and [the] a signal output line in a unit cell, or between two unit cells operating in time series fashion, or between two adjoining unit cells, and
wherein each said unit cell comprises a plurality of photoelectric conversion portions connected to a common amplifying transistor.

9. (Amended) The solid-state image pickup device according to claim [1] 2, wherein during a period in which the selecting means are turned on, a noise signal and an optical signal are read out from the signal output line.

10. (Twice Amended) The solid-state image pickup device according to claim [1] 3, wherein the unit cells are arranged in a two-dimensional matrix.

12. (Twice Amended) An image pickup system comprising the solid-state image pickup device according to any one of claims 1 [to 11], an optical system for optically forming an image onto the solid-state image pickup device, and a signal processing circuit for processing an output signal from the solid-state image pickup device.